studies through these reams and reams of paper. Consequently, the first class of readers have hitherto for the most part been satisfied to gain their knowledge of Spencer through the "Cosmic Philosophy" of Fiske, while the latter class have experienced a hitherto hopeless difficulty in refreshing their memories upon particular points, or in finding passages to which they may wish to refer in publications of their own. Speaking for ourselves, we are conscious of often having done a negative injustice to Mr. Spencer on this account, simply because, in order to avoid the possibility of any positive injustice in the way of misrepresentation, we have deemed it wisest not to allude to him at all.

Now, the epitome which Mr. Howard Collins has supplied so admirably satisfies all the requirements of the case that henceforth the general reader will be able to acquire a clear knowledge of Mr. Herbert Spencer's philosophy in one-tenth of the time that it has hitherto been necessary to expend, while—as Mr. Spencer himself observes in his highly commendatory preface—more serious students will find that "a clear preliminary conception is more readily obtained from a small outline-map than from a large one full of details." Lastly, for all purposes of reference, this epitome leaves nothing to be desired; for not only does it run parallel with the original—chapter by chapter and section by section—but it is also furnished at the end with an alphabetical index of subject-matter: so that, if a man is writing upon any of the innumerable topics which Mr. Spencer has handled, he can immediately ascertain all that Mr. Spencer has said with regard to them.

For these reasons we cordially recommend this most painstaking epitome to every class of readers; and we cannot doubt that its publication will greatly promote the diffusion of Mr. Spencer's thought in all the English-speaking communities of the world. G. J. R.

The Earth and its Story. Edited by Robert Brown, Ph.D., F.L.S. (London: Cassell and Co., 1889.)

THE continued publication of good and popularly written scientific works is one of the most gratifying signs of the times; it testifies, in no uncertain manner, to the growth of a taste for scientific knowledge in the mind of the general public, and hence is a matter of congratulation.

Of all the sciences none may perhaps be made more interesting than physical geography, or its modern equivalent physiography. The desire to know something about the earth's position in the universe, its formation, and its inhabitants, is and always has been innate in man, and we are glad, therefore, to welcome works that may satisfy this craving after light. The one before us deals in a comprehensive manner with the geographical distribution of plants and animals, and the agents concerned in their dispersion; with the physics of the sea, waves, currents, and tides; with terrestrial magnetism; climate and the causes affecting its distribution; rainfall and precipitation in general. A considerable amount of space is given to descriptions of geological formations and the fossils they contain, whilst ideal landscapes with restored animals are plentifully figured. We regret, however, that only a very meagre description is given of the earth as a planet. It must be remembered that astronomy is a very important part of physiography, even when looked at from a utilitarian point of view. The reason why the movements of the heavenly bodies have been studied from time immemorial is that a knowledge of them was necessary in order to meet the vicissitudes of life, and even before primitive man had inquired into the constitution of the earth he had arrived at crude conceptions as to the constitution of the universe from uncritical observations of celestial phenomena. The priority of these conceptions demonstrates their importance, and therefore, in a work intending to convey earth knowledge, the verification of the earth's rotation and revolution and the determination of its true size and shape should certainly be included. The measurements of arcs of meridian, whereby the exact size and shape of the earth may be found, are easy to describe, and preferable to the proofs of the earth's rotundity known in the time of Peate; besides which, such investigations essentially belong to physical geography. But, excepting these omissions, the work is one of sterling value; it is profusely illustrated, each of the two volumes containing twelve coloured plates and about 270 woodcuts, and the explanatory text is very readable and interesting throughout. Such a production will naturally gravitate to the free public libraries and similar institutions, and will be of great use in extending scientific knowledge.

Steam. By William Ripper, Professor of Mechanical Engineering in the Sheffield Technical School. (London: Longmans, Green, and Co., 1889.)

THIS volume consists of an elaboration of notes of lectures given by the author to an evening class of young mechanical engineers. For its size, it contains much useful information; and the simplicity of expression, and the absence of elaborate calculation, throughout the chapters help to make it suitable for elementary classes. The author gives special prominence to the principles involved in the economical use of steam. This part of the book is particularly lucid and concise, being perfectly clear to the average student. He also describes well the compound, triple, and quadruple expansion engines, especially dealing with the general idea of the expansion and course of the steam through the cylinders on its way to the condenser, as well as with the general laws regulating the volumes of the cylinders. Although the subject is treated in an elementary manner, there is much sound work in the book. Text-books on steam have greatly improved of late years from an engineer's point of view, and the present volume is a good example of the way in which the subject should be handled for the benefit of budding engineers.

The illustrations and diagrams are good, the former being taken from engines in actual practice. Fig. 134, however, does not represent particularly good practice. The flat crown of the fire-box of locomotive type of marine boilers is probably seldom stayed after the manner shown; the crown stays being generally screwed through the shell of the boiler, and either rivetted over or fastened with a nut and a copper washer. Assuming that these stays are screwed through the fire-box crown sheet, it would be interesting to know how the author proposes to place them in position, as shown in the figure. Fig. 137 represents a Ramsbottom locomotive safety valve. Although correct in principle, it is quite a curiosity in point of design, the valve in general use being very different in appearance, as the reader may observe by referring to the one shown on the locomotive boiler illustrated in Fig. 132. We may say in conclusion that a fuller index would have added considerably to the value of the book. N. J. L.

Australia Twice Traversed. By Ernest Giles. In Two Vols. (London: Sampson Low and Co., 1889.)

THE narrative presented in these volumes has been compiled by Mr. Giles from the journals written by him during five exploring expeditions into and through central South Australia and Western Australia from 1872 to 1876. The materials of the book are not, therefore, very fresh, but this ought not to detract much from their interest, as hitherto only fragmentary accounts of Mr. Giles's travels have been printed. It must be admitted that records of wanderings in the interior of Australia are not usually very fascinating. Mr. Lumholtz's book, which we lately reviewed, is a brilliant exception to the general rule. We cannot say that Mr. Giles's work rises to an equal height above the ordinary level; for it lacks that fine insight into

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native life and temperament which is the special and most valuable characteristic of the Danish explorer's record. Moreover, Mr. Giles had to pass through much desert country, the description of which could have been invested with charm only by a writer of genius. The book, however, shows that he has the courage, resource, and spirit of enterprise which are absolutely essential to an explorer, and here and there his story is lighted up by what he has to say about the few well-watered and pleasant tracts of land through which he passed during his various journeys. His explorations were necessary links in the chain of Australian geographical research, and he has acted wisely in preparing a full and accurate account of them. The value of the work is considerably increased by maps and illustrations.

New Zealand for the Emigrant, Invalid, and Tourist. By John Murray Moore, M.D. (London: Sampson Low and Co., 1890.)

DR. MOORE spent nine years in New Zealand, and not only enjoyed his stay, but derived from it renewed health and vigour. When, therefore, he began to set down the results of his observation and experience, he was in the right mood for the production of a genial and appreciative record; and his book ought to be of considerable service to each of the three classes mentioned on the title-page. The most original parts of the work are two chapters, in one of which he indicates the various climatic zones into which New Zealand as a health-resort is divisible, while in the other he presents a full account of the characters and therapeutic achievements of the principal thermal springs of the North Island. Both of these chapters will be read with interest by medical men, and by invalids who may feel disposed, as the author puts it in the rhetorical style he sometimes affects, to "fly on the wings of steam to the realm of the Southern Cross." He gives a good description of Auckland, "the Naples of New Zealand," and sets forth pleasantly and effectively the impressions produced upon him during excursions to the hot lakes and terraces, and to the west coast Sounds. An instructive chapter is devoted to the volcanic eruption of Mount Tarawera, and Dr. Moore offers much valuable information about self-government in New Zealand, and the settlement of the land; and about social life, public works and institutions, productions and industries. The volume includes several maps, in one of which are shown New Zealand's climatic zones.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

A Key to the Royal Society Catalogue.

IN his anniversary address to the Royal Society, the President, referring to the great catalogue of scientific papers, used these words:—"The utility of the work would obviously be much increased if it could be furnished with some sort of key, enabling persons to find what had been written on particular subjects. I am not without hopes that this very desirable object may yet be accomplished, notwithstanding the magnitude of any such undertaking." Almost everyone engaged in scientific research must have felt the want of such a key, and will join in the President's hopes. My present object is to suggest a scheme for supplying the want at comparatively little trouble and expense.

A complete subject index, arranged in alphabetical order, would indeed be a great undertaking. The subdivisions being minute, most of the papers would have to be catalogued more than once, and, even if the references were only to the name of the author and the number of the paper in the present catalogue, the new catalogue would probably be as large as the old. The key that I suggest would be much smaller, and yet in many cases more convenient. The proposal can hardly be novel, but its advantages may not have been fully realized. Divide up the whole of science into some 5000 heads, classified in their natural order underthe various branches—pure mathematics, astronomy, physics, chemistry, &c. Under each head place the names of the writers who have treated of the subject, with the dates of their earliest and latest papers thereon. If the heads are skilfully selected it will seldom be necessary to classify a paper under more than one head.

Some idea of the size of the suggested work may be gained from the following considerations. In the eight volumes of the catalogue at present published (1800–63 and 1863–73) are the names of about 57,000 authors, treating the names in the second part as entirely new. Of these, about 30,000 have only one paper each, and the remaining 27,000 average about eight papers each. In view of the tendency of all writers to devote themselves to special subjects, three heads seem a fair allowance for the papers of each of the 27,000 authors. We have thus 111,000 authors' names to be catalogued under 5000 heads, giving an average of about 22 names to each head. Such a list, printed in the style of the present catalogue, but with three columns instead of two in a page, would fill a volume of about 800 pages. Each of the present volumes contains about 1000 pages, and is sold at 20*s*., which we are told covers the cost of the paper and printing. If the sections devoted to the various sciences—chemistry, geology, &c.—were published separately, the sale would probably be large.

With regard to the use of this list, the labour of looking up 20 or even 50 names in the main catalogue would generally be trifling compared with the unavoidable labour of reading the actual papers when the references had been found. In many cases the dates would show at once that certain authors need not be referred to. Even if we had a complete alphabetical subject index, it would be necessary to think of every possible word by which the particular subject in question might be denoted, so that the classified list, though more troublesome at first, would often prove more satisfactory in the end. With 5000 heads for the whole of science, perhaps 750 might be allotted to physics, and of these, 150 to light. This would admit of such subdivisions as velocity of light, colour sensation, fluorescence, selective reflection, magnetic rotation of the plane of polarization, &c. Those subdivisions should be selected, into which the actual papers most naturally fall, rather than those which seem ideally correct.

The labour of preparing such a list as I propose would be in itself considerable, but, compared with the colossal enterprise which the Royal Society has already carried out, it would be small, and the service to science would be great.

Hotel Buol, Davos. JAMES C. MCCONNEL.

Osteolepidæ.

THE letter of your correspondent "R. L. + E." somewhat misses the issue raised in the passage to which he refers. In that passage the question was not raised whether or no we are right in making family names from the inflected form of the generic ones, the sole contention being for uniformity in this respect. Thus, if we are right in making *Rhizodontidæ* (and not *Rhizodidæ*) from *Rhizodus*, we clearly ought to have *Osteolepididæ* (and not *Osteolepidæ*) from *Osteolepis*, both these generic names being precisely analogous compounds. If, on the other hand, your correspondent is right in saying that we should regard all such names as adjectival, then we ought at once to abolish family names like *Macropodidæ*, *Dasypodidæ*, *Octodontidæ*, &c., in favour of *Macropidæ*, *Dasypidæ*, and *Octodidæ*. R. L.

THERE can be no question that "R. L. + E." is himself mistaken in his arbitrary assumption of a rule for the formation of compound adjectives in Greek. Sometimes the lengthened genitive is used as the stem, as in *δισώματος* ("disomatus"); sometimes the short nominative stem is employed, as in *δίστομος* ("distomus"); and sometimes both forms occur side by side, as *φιλαίματος* ("philæmatus") and *φίλαιμος* ("philæmus"), the former seeming to be preferred. These are words actually in use in Greek writers, and any lexicon will give plenty of other instances. But his whole argument is beside the point; the question is not whether an adjective is formed from the lengthened genitive, but whether an adjective, formed from a noun

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